Isolation of Basal cells and submucosal gland duct cells from mouse trachea.

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Authors: Ahmed E Hegab, Vi Luan Ha, Yasser S Attiga, Derek W Nickerson, Brigitte N Gomperts

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Public Summary:
Here we describe the methods for isolating stem cells from the airways of mice. In addition, we describe techniques for culturing the cells to promote their differentiation into airway cells and an ex vivo mouse model that allows the airway stem cells to differentiate in the fat pad in the back of the mouse. The technique was filmed and is available online in addition to detailed protocols for all of these techniques.

Scientific Abstract:
The large airways are directly in contact with the environment and therefore susceptible to injury from toxins and infectious agents that we breath in (1). The large airways therefore require an efficient repair mechanism to protect our bodies. This repair process occurs from stem cells in the airways and isolating these stem cells from the airways is important for understanding the mechanisms of repair and regeneration. It is also important for understanding abnormal repair that can lead to airway diseases (2). The goal of this method is to isolate a novel stem cell population from the mouse tracheal submucosal gland ducts and to place these cells in in vitro and in vivo model systems to identify the mechanisms of repair and regeneration of the submucosal glands (3). This production shows methods that can be used to isolate and assay the duct and basal stem cells from the large airways (3).This will allow us to study diseases of the airway, such as cystic fibrosis, asthma and chronic obstructive pulmonary disease. Currently, there are no methods for isolation of submucosal gland duct cells and there are no in vivo models to study the regeneration of submucosal glands.